

The Introduction of CCHP Projects in Beijing

Beijing Energy – Net DE, Ltd.

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Beijing Energy-net De Co., Ltd
北京恩耐特分布能源技术有限公司

Profile of Beijing Energy-Net DE, Ltd.

- **1st Domestic CCHP & DE technology and comprehensive Services Provider**
- **Established in 2002, invested by Beijing Gas Group & others**
- **Excellent engineering and marketing team for**
 - **CCHP project development, investment, construction management, and O&M**
 - **CCHP technology provider and system integrator**
- **Developing a series of CCHP projects in Beijing with total investment more than RMB 2 billion RMB**
- **Technology provider, construction & testing management and O&M for the CCHP project of Beijing Gas Building**



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Energy Conservation Layout

The 11st “Five-Year Plan”: The energy consumption / GDP Unit will be reduced for 20% by the end of the plan.

Emphases industry, transportation, commercial & civil construction are regarded as the major three energy conservation sectors according to 《Long-term & Medium-term Layout for Energy conservation》 .

- Booming development of CHP, CCHP, and other cogeneration related technologies**
- Optimize power supply layout, explore the market for small-scale DE project**
- Encourage cool& heat storage and CCHP technologies to facilitate 65% energy-conservation strategy. (ie. Beijing, Tianjin)**



Energy Status in Beijing

Energy-conservation is extremely crucial for Beijing, since it is a large energy consumption city .

(1) Lower energy utilization efficiency

(2) Industry manufacture's energy consumption: 55.5%
(Developed countries: 30% - 40%)

(3) Grave pollution caused by coal, the major fuel

(4) Energy supply pressure

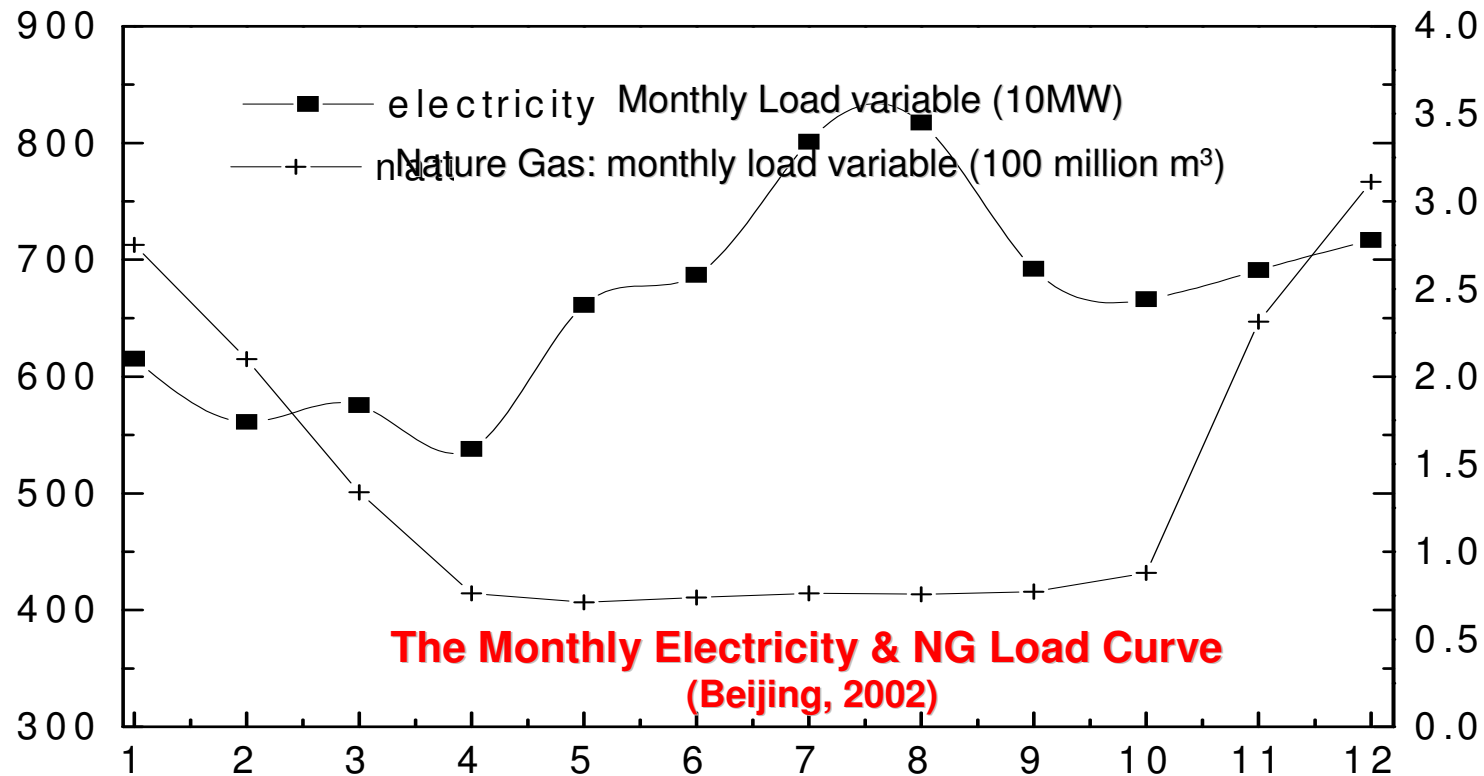
(5) Power supply tension & lower utilization rate of NG during summer



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NG – Electricity

Peak-to-Valley Difference

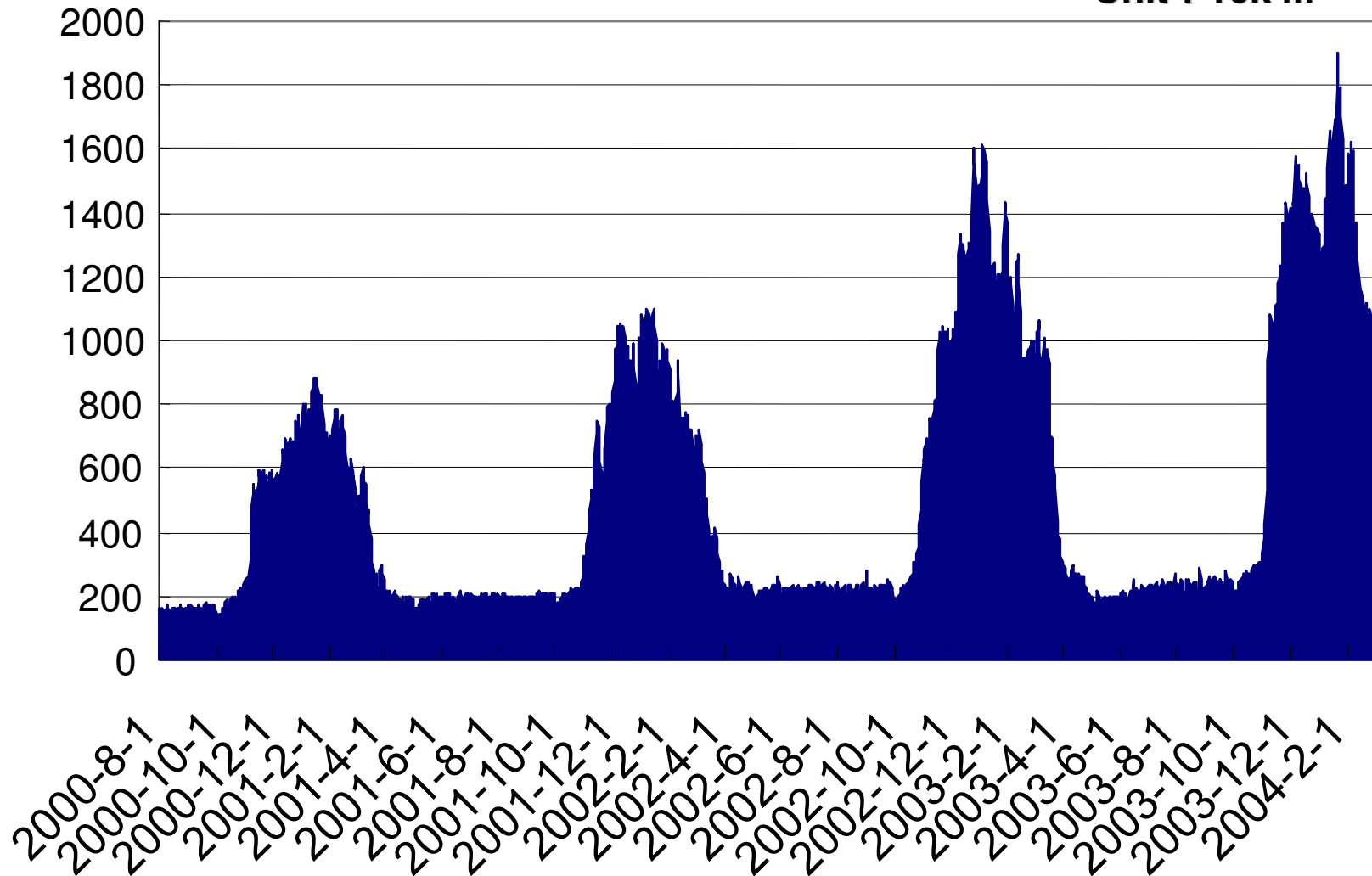


- **Electricity Load: Peak-to-valley ratio**
- **2002 - Summer Peak load: 8240 MW**
 Winter Peak load: 5800 MW
- 2003 - Peak load : 8330MW**
- 2004 - Peak load: 9430MW**
- 2005 – Peak load: 10700MW**

Beijing NG Status

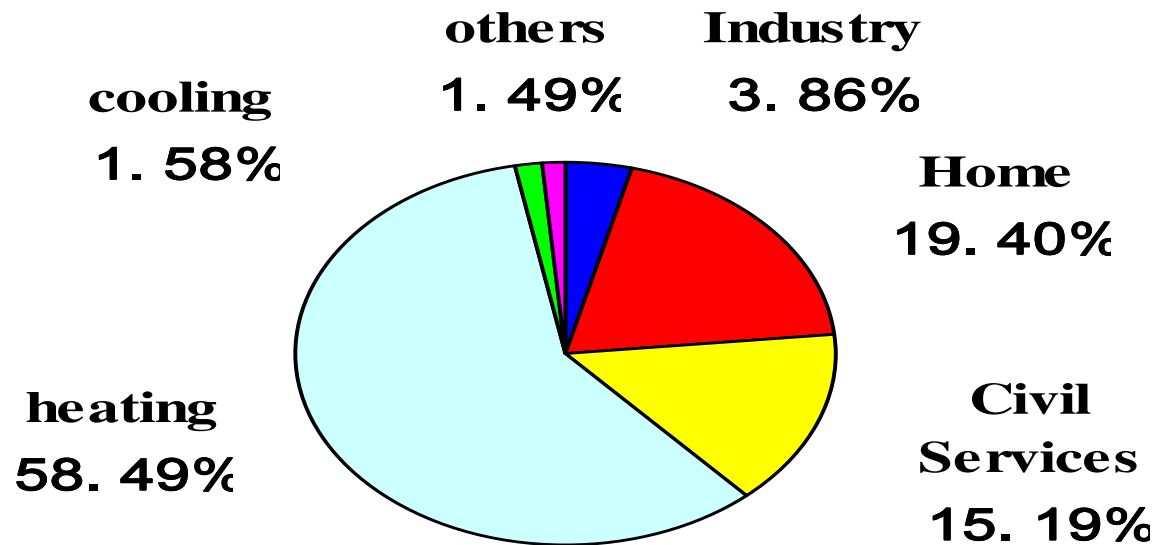
2000—2004 NG Consumption Curve

Unit : 10k m³



Beijing NG Status

2005 NG Consumption Layout



Energy Consumption Target, 2008 Beijing

■ Environment

City environmental index will close to corresponding index of WHO or developed countries.

■ Energy consumption target

Energy consumption / GDP unit - 0.865 ton coal / 10K RMB

Energy consumption / person – 3.318 ton coal / person

■ Energy adjustment

To the year 2008, 80% of increasing part of energy consumption will be high quality energy (80%), rest 20% will be coal and coke. The total coal and coke proportion will be controlled under 48%.

■ Energy Supply

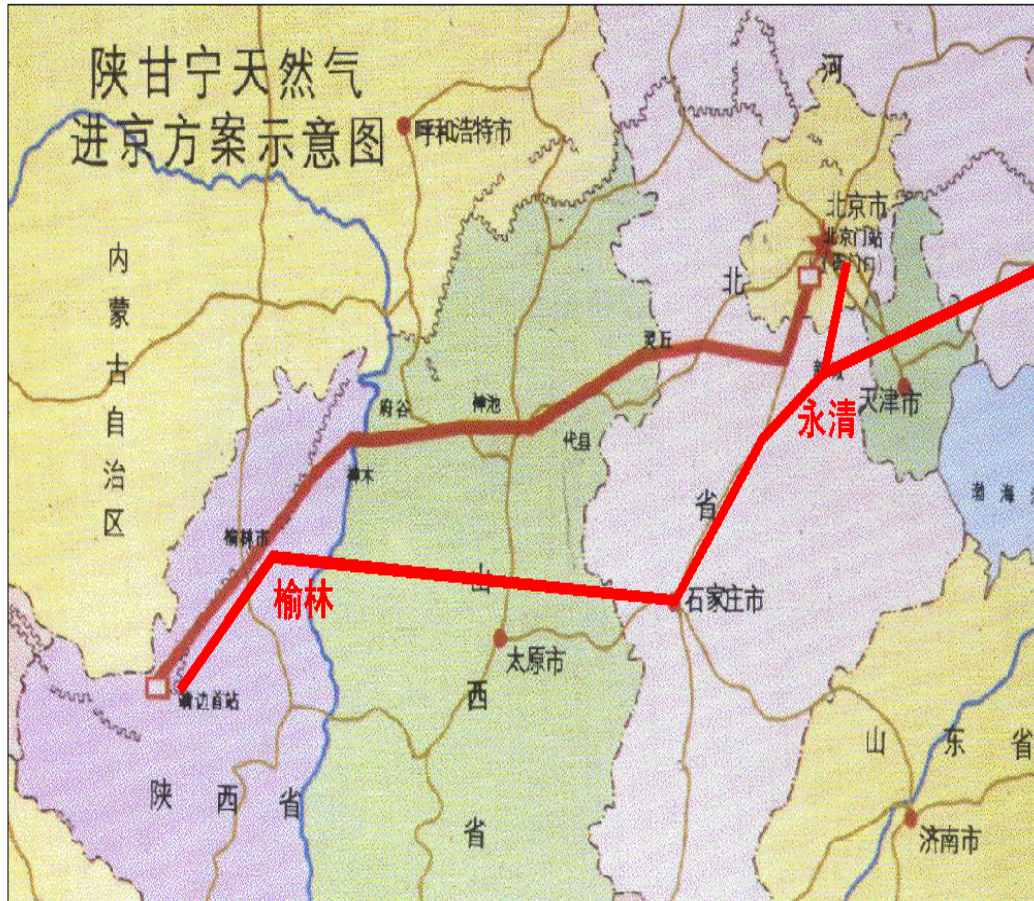
Clear energy will be efficiently promoted.



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Nature Gas Supply to Beijing

ShanJing Gas Line



ShanJing 1st Gas Line

- ✓ Built in 1997
- ✓ Capacity: 3.3 billion m³ / year
- ✓ Offers 2.4 billion m³ to Beijing

ShanJing 2nd Gas Line

- ✓ Total capacity: 12 billion m³ / year
- ✓ Offering 5.8 billion m³ to Beijing
- ✓ Completion on Sep, 2005

The total Capacity of 8.2 billion m³ / year. offer to Beijing.

LNG terminal project: Phase1, completion in 2008, total designed capacity : 3 million ton annually.

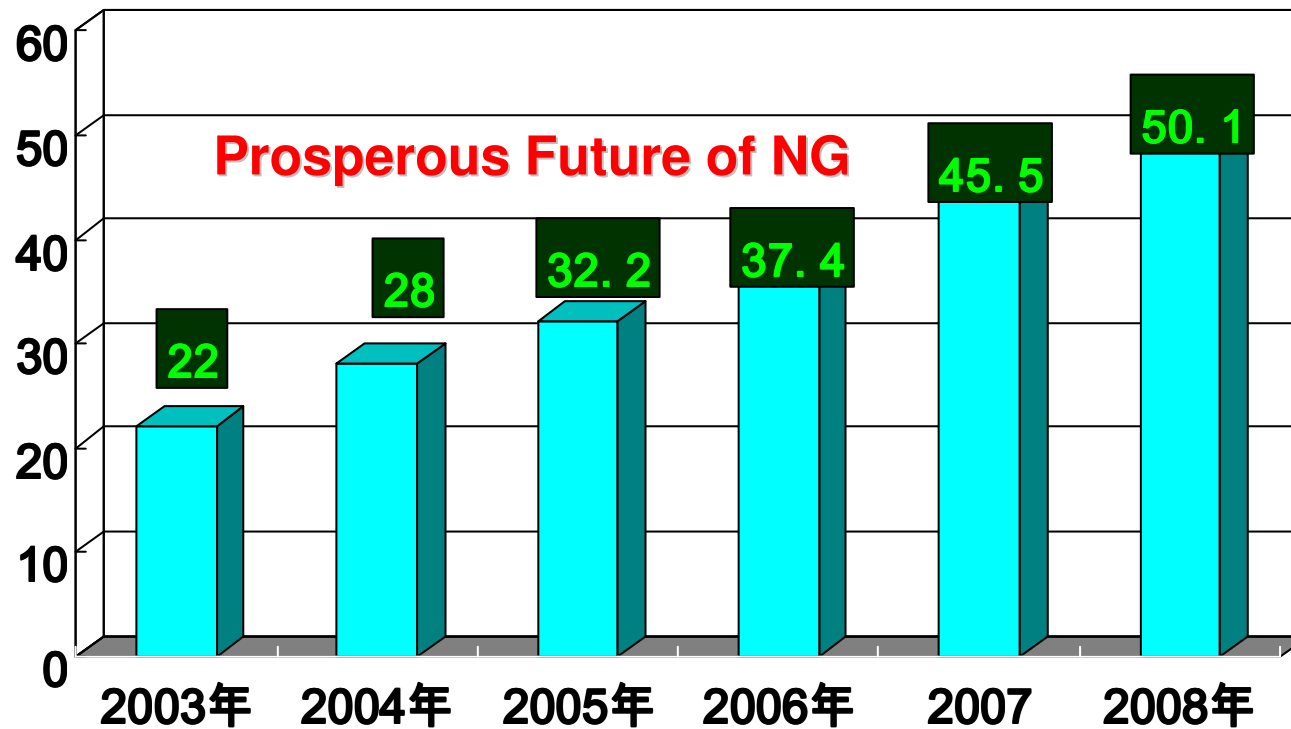


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Nature Gas Development plan in Beijing

2003-2008 NG Annual Consumption

(One Hundred Million m³ / year)



2008
annual NG
supply
capability
to Beijing
is 8.2
billion m³



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Development of DE Technology

CCHP is a best option for NG utilization to figure out insufficient NG storage issue in China.

- **Improve energy utilization efficiency**
- **Balance peak-to-valley difference for NG & electricity**
- **Enhance security of energy supply**
- **Cost effective**
- **Environmental friendly**



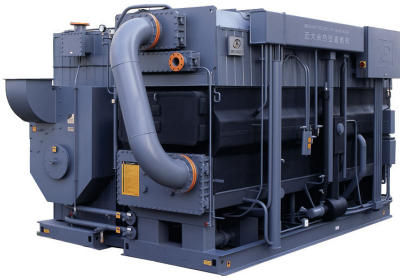
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Beijing Gas Group Control Center CCHP

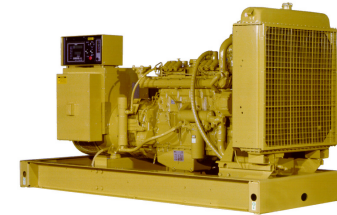
- The headquarter of BGG and Operating Center of gas pipeline network, monitoring the entire network in Beijing.
- The 12-floor building with totals area of 32,800m²
- The CCHP system satisfies the building overall loads of heating, cooling and electric power.
- Designed maximum electricity load 1,640kW, cooling load 3,148.8kW and heat load 2,296kW.



Beijing Gas Group Building CCHP Project



Broad Exhaust Heat DFA



Caterpillar Power Generator



Beijing Gas Group Building CCHP Project

Mayor of Beijing's visiting in BGG



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Beijing Gas Group Control Center

Gas Engine:

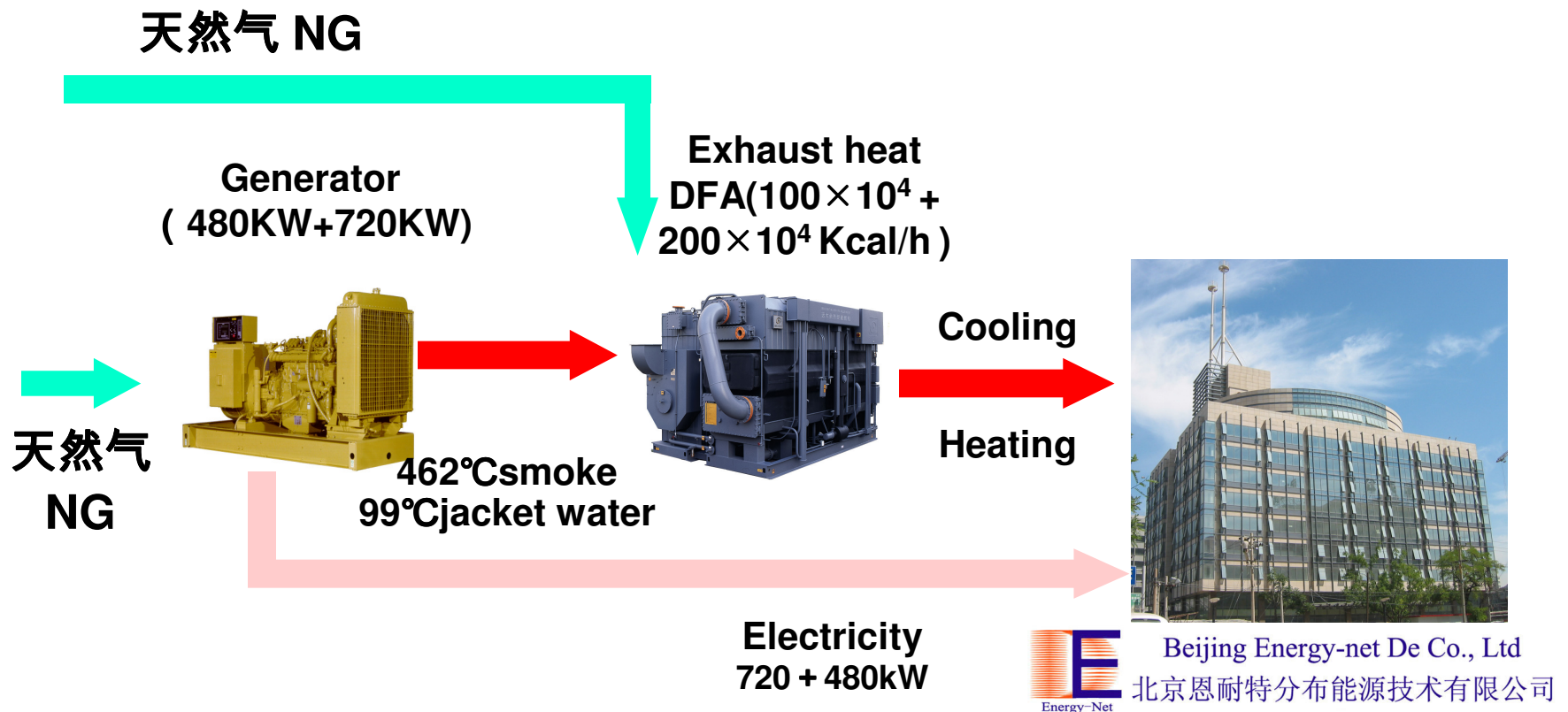
G3508 : 480 kWx1

G3512 : 725 kWx1

Exhaust Heat DFA :

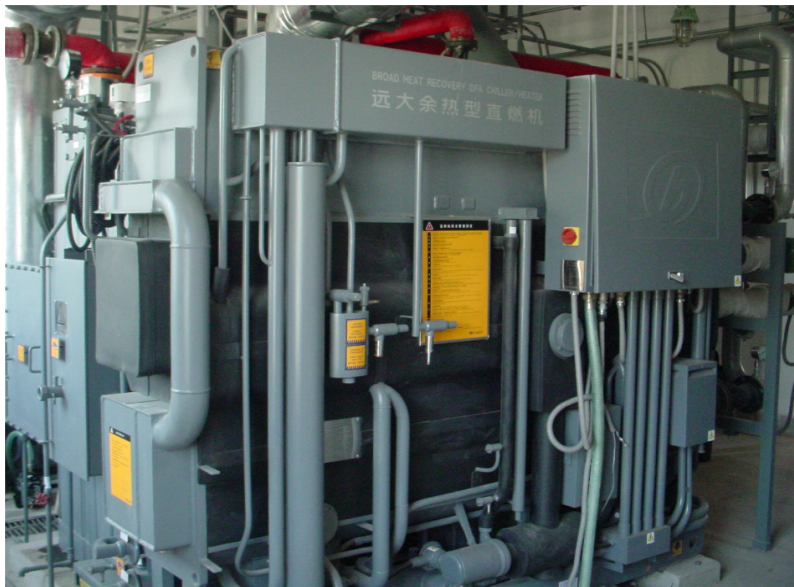
$100 \times 10^4 \text{ kcal/h} \times 1$

$200 \times 10^4 \text{ kcal/h} \times 1$



Ciqu Gas Pump Station

- Microturbine + DFA
- Microturbine : 80KW
- Exhaust heat DFA : 200,000Kcal



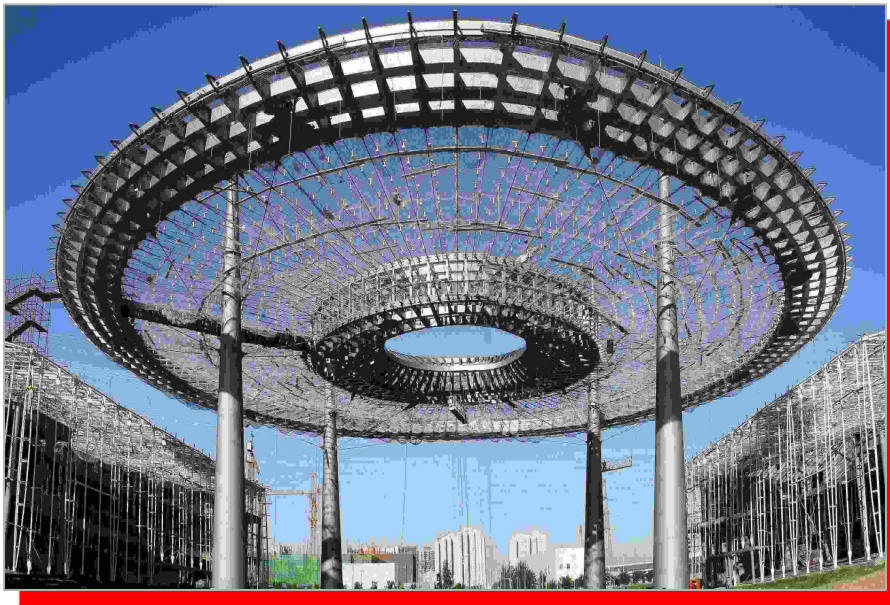
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CCHP Projects under Construction in Beijing

ZhongGuanCun Software Park

A Center for Software Marketers in Beijing

**Generation Unit:
1210kw gas turbine**



**Air conditioning Unit:
3 million Kcal. Exhaust Heat DFA
3 million Kcal. Standard DFA**



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Booming CCHP Market in Beijing

Energy-Net has already developed a series of profitable CCHP projects including ZhongGuanCun Medicine Park, Phase III CWTC, ShangDi Information Center, etc. with more than 2 billion RMB total investment. Above-mentioned projects are supposed to offer cooling, heating & power to 6 million m² site area.



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CCHP projects over 10000 kw : launched or under construction

Other projects (lump sum investment over 2.8 billion RMB) : under development

N	Project	Capacity (kw)	Notes
1	Irrigation Works Hospital	115	Under construction
2	Peixin Office Building	180	Under construction
3	Tsinghua Wenjin Apartment Block	2,400	Under construction
4	ZhongGuanCun Software Park	1,200	Under construction
5	ZhongGuanCun Shopping Mall	4,300	Under construction
6	Baoneng Thermal Power Firm	1,200	Under construction
7	Control Center Building of BGG	1,200	Operating
8	Ciqu Pump Station	80	Operating
Total		10,675	



CCHP Projects under Planning (1)

S/N	Project	Capacity (kw)	Total Investment (10K RMB)	Investor
1	Northern Area of Beijing Airport	22000	20000	Energy-Net / BGG
2	ZhongGuanChun Life Science Park	12000	26923	Energy-Net / BGG
3	CWTC, Phase III	9200	10,000	Energy-Net / China Gas Group
4	Electronic Park	2832	4428	Energy-Net / BGG
5	Olympic Underground Shopping Mall	20000	22000	Energy-Net
6	Harvard International Hospital	25000	30000	Energy-Net
7	World Clothes R&D Center	20000	22000	Energy-Net
8	TongZhou Technology Building	2000	3400	Energy-Net
9	Beijing International Automobile Exposition Center	24000	25000	Energy-Net / BGG



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CCHP Projects under Planning (2)

S/N	Project	Capacity (kw)	Total Investment (10K RMB)	Investor
10	TongZhou XinCheng Administration District	25000	30000	Energy-Net
11	Shangdi Gas Power Station	150000	67784	UTC
12	The Southern Railway Station	4500	7000	Energy-Net / Railway Dep.
13	China Development Bank Office Building	3800	5861	Energy-Net / China Development Bank
14	Beijing DiTan Hospital	1650	3700	Energy-Net
15	Olympic No. 9 Building	1250	3041	Energy-Net/ Beichen Group
16	Beijing Siemens Office Building	1200	3600	Energy-Net /Siemens
	Total	324432	285320	



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Tsinghua Wenjin International Apartment Block

- **Construction Area: 120,000 m²**
- **Total capacity: 2400KW**
- **Total investment: 55 million RMB**



CCHP Project under Planning in Beijing

Zhongguancun Medical Park

- Well-integrate medical treatment and medicine industry
- Layout Area: 1.2 million m²
- Heating & Cooling area: 830,000m²
- Total capacity: 13Mw
- Estimated total investment: RMB 27 million



The current CCHP R&D project by Energy-Net

- **Study varies building's energy load and analysis software**
- **CCHP equipment selection and system integration**
- **Technology for CCHP electricity generation connecting with grid in China.**
- **Market survey of CCHP in China**
- **Model and analysis software for combination of gas CCHP and other DE technology**
- **Cost analysis of CCHP in china**
- **Technology and finance analysis of CCHP in china**



Barriers & Issues

(1) Policy and Regulation

- ⊙ **Grid interconnection, electricity sales**
- ⊙ **Lack of referential policies related with energy conservation in taxation, pricing, subsidy, etc.**

(2) Technology

- ⊙ **Insufficient localization for equipment manufacturing**
- ⊙ **Immature experiences in system construction and O&M**
- ⊙ **Lack of technological specification and standards**
- ⊙ **Strict requirement for factory construction condition**

(3) Instability of Energy Pricing

(4) Unsatisfied popularization of CCHP technology



The problem of nature gas development strategy in China

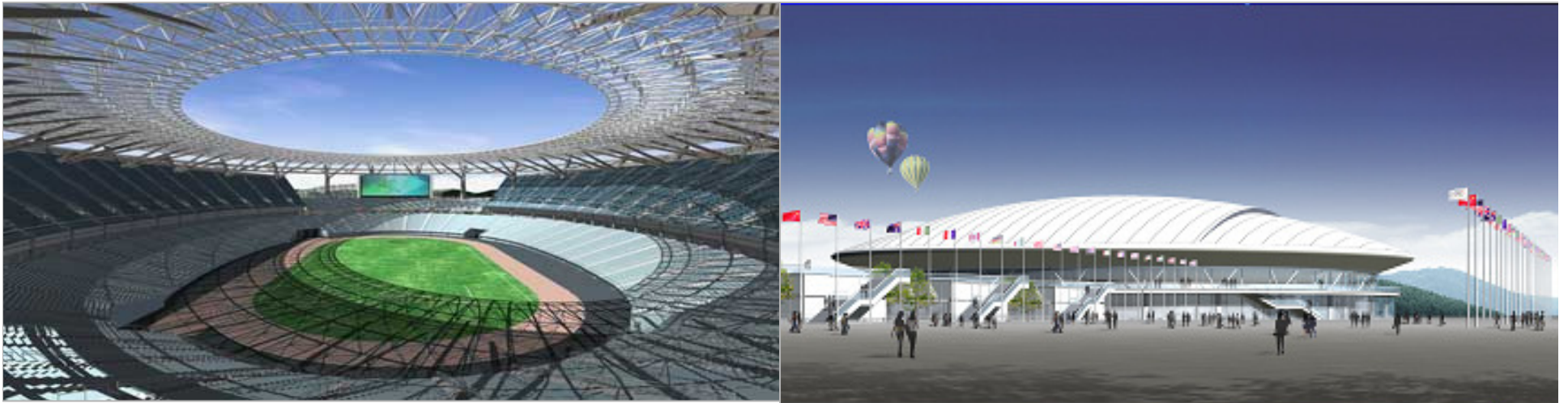
CCHP is a best option for NG utilization to figure out insufficient NG storage issue in China

- **1997 CIECC Study Report: 50-70% NG should be used for power generation in China, according to the experiences from developed countries**
- **SDRC purchase 9F gas turbines, requiring about 5 billion USD**
- **Building large NG power plants along with the pipeline**
- **NG shortage, generation of those power plant ???**
- **Beijing Large NG power plant construction plan???**
- **Incentive policy issuing slowly because NG shortage**



Energy Park Dram for Olympic

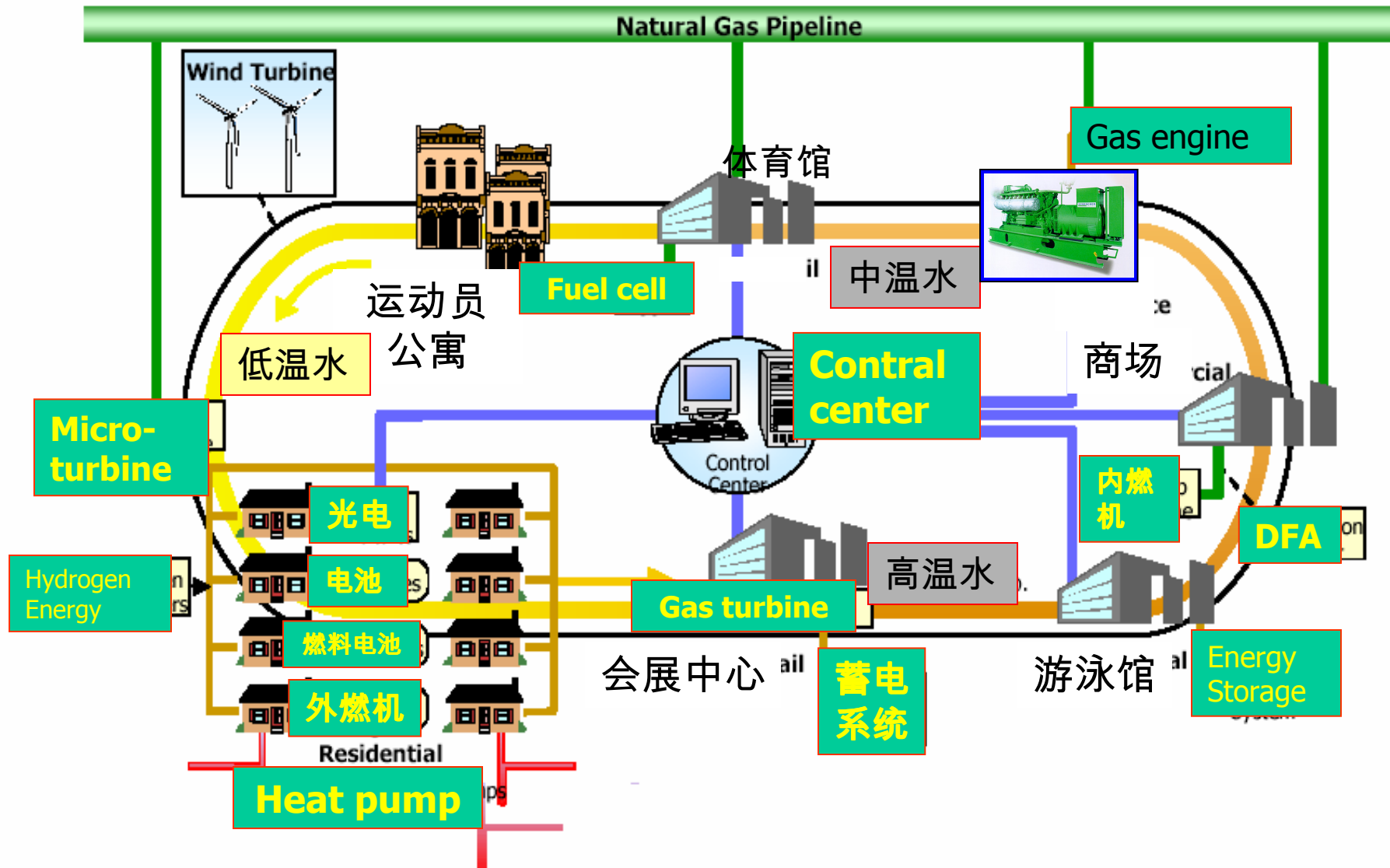
Suggested by Energy-Net, associate with 6 Chinese academicians, we proposed an Energy Center Ideal to Olympics in Beijing



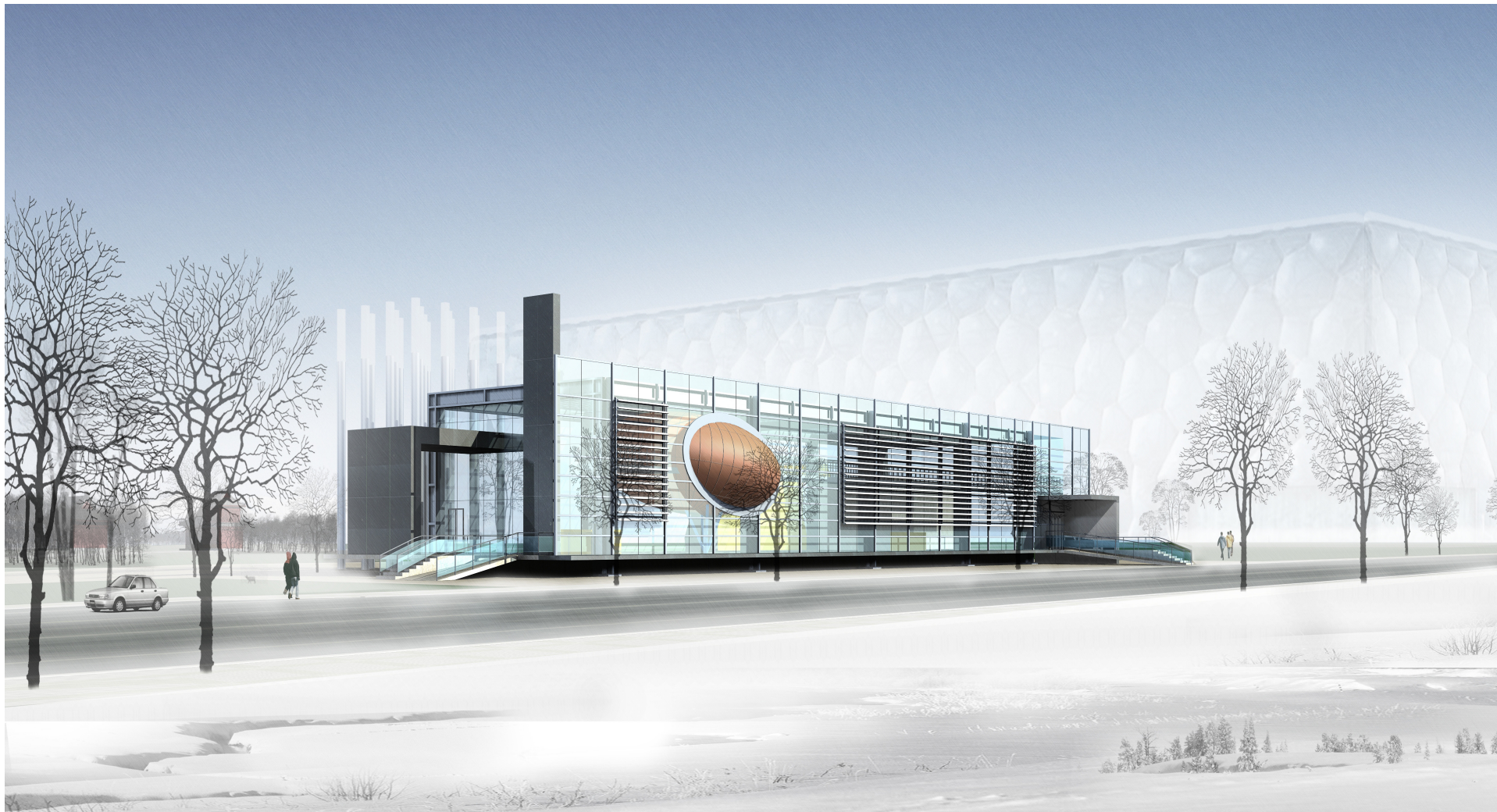
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奥运能源展示中心

天然气



Proposed Energy Center in Olympic Park



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THANKS
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